

# SCIENCE NEWS-LETTER

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## FLOWERS FROM STEEL

*Simple Test for Specimens That Look Alike*

(See page 263)

Vol. XVII

No. 472

# Propose Patents on Plants

Horticulture

## New Bill Would Protect Burbanks of Future

**F**UTURE Burbanks will enjoy the same patent protection on their living products that the Wrights, Edisons and other inventors have long had for the results of their mechanical genius, if a bill now on the calendars of both House and Senate is enacted. The proposed measure has the endorsement of many prominent persons and organizations and is expected to pass.

By its terms the originator of a new plant variety may apply for and receive a patent on his product just as if it were a machine or a chemical formula. The protection thus to be extended, however, will apply only to plants that can be propagated by asexual or vegetative means; seed-propagated plant varieties, even if new, are not included. A further exception is made in the case of plants propagated by tubers, because of the strong opposition of growers of certain classes of field crops.

A bill to give plant breeders patent protection has long been desired by horticulturists, among them the late Luther Burbank. As things stand at present, the originator of a new and valuable plant variety can reap a reward for his labor only by selling his first small stock of plants at a high price. Occasionally a good-sized fortune will be paid for a half-dozen strawberry plants, but this is a rare exception; usually the plant originator gets little or nothing. And even when he has been shrewd enough to build up a high bid for his little monopoly, the first price is all he ever receives. In a few years the plant is anybody's plant, like a patent-expired invention. It is to remedy this situation that the present legislation has been proposed.

The field covered by the proposed law is very wide. Among patentable plants will be new varieties of practically all fruit and nut trees, such as apples, oranges, cherries, pecans and walnuts; most small-fruits, including grapes, raspberries, strawberries and

blueberries; and many ornamental shrubs, vines and perennial herbs, like roses, lilacs, wistarias, phloxes and peonies. Most field crops are unaffected, because they are seed-propagated or tuber-propagated.

Both Thomas A. Edison and Mrs. Luther Burbank have wired to Congress their endorsement of the bill. Edison states: "Nothing that Congress could do to help farming would be of greater value and permanence than to give to the plant breeder the same status as the mechanical and chemical inventors now have through the patent law. There are but few plant breeders. The bill will, I feel sure, give us many Burbanks."

Says Mrs. Burbank: "Have just received welcome news of congressional activity looking to protection of plant breeders and producers of new fruits by patent. As you probably know, this was one of Luther Burbank's most cherished hopes. He said

repeatedly that until the government made some such provision for insuring experimenter or breeder reasonable protection, the incentive to creative work with plants was slight and independent plant breeding would be held back to the great detriment of horticulture. In one manuscript, he writes: 'I have been for years in correspondence with leading breeders, nurserymen and federal officials and I despair of anything being done at present to secure to the plant breeder any adequate return for his enormous outlays of time, energy and money. A man can patent a mousetrap or copyright a nasty song but if he gives to the world a new fruit that will add millions to the value of the earth's annual harvests, he will be fortunate if he is rewarded by so much as having his name connected with the result. Though the surface of plant experimentation has thus far been only scratched and there is so much immeasurably important work waiting to be done in this line I would hesitate to advise a young man, no matter how gifted or devoted, to adopt plant breeding as a life work until America takes some action to protect his unquestioned rights to some benefit from his achievements.'

Commissioner of Patents Thomas E. Robertson stated that the amount of extra work which may be involved in administering the new class of patent claims has not yet been estimated by his office. For this reason, the bill as it stands carries no special funds for administration, but these will be asked for as needed. The bill provides that the Patent Office may receive the assistance of qualified plant scientists in the Department of Agriculture in passing judgment on the claims of applicants.

The bill will not be retroactive if it becomes law. Plants that have been in public use for more than two years will not be subject to patent.

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### The Answer Is In This Issue

Will the proposed bill allow breeders to secure patents on existing varieties? p. 258—What compound has been used to hasten the growth of new tissue over wounds? p. 259—Of what scientific value would a school for twins be? p. 259—With what kind of toys did the children of ancient Egypt play? p. 260—What kept the furniture and baskets of old Egypt from decay? p. 261—How would molten iron look against the sun? p. 262—Have hagfish a long family tree? p. 262—Where will the next eclipse be visible? p. 263—What plant destroys mosquitoes? p. 264—Why does a chicken jerk its head? p. 265—When was ether brought into use? p. 266—67—Are plants older than animals? p. 269.



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# Tools of India Found in Philippines

Archaeology

## Excavations Show Prehistoric Trade Existed

TRADE relations between India and the Philippine Islands more than two thousand years ago, and a prehistory stretching back to the close of the Old Stone Age, have been revealed by recent excavations on the island of Luzon. So Prof. R. B. Dixon of Harvard University informed the American Philosophical Society at its meeting in Philadelphia this week.

This vast backward extension of Philippine history has been due practically altogether to the work of one man, Prof. H. Otley Beyer, head of the department of anthropology at the University of the Philippines, Prof. Dixon said. Prof. Beyer made his first discovery of prehistoric relics in an excavation for a dam, and since then has found and explored nearly a hundred sites. Since no government funds were made available for the work, Prof. Beyer has been carrying it on at his own expense, and has labored to such good purpose that he now has a collection of scores of thousands of specimens.

Five culture levels are represented in his digs. The uppermost consists of an already-known Chinese stratum, dating back as far as 1000 A. D. Below this is a layer of Iron Age culture, and then two layers of Neolithic remains. The fifth and lowermost layer consists of chipped, unpolished stone implements, and represents either late Old Stone Age or a transition from this to the Neolithic.

The implements in the Iron Age stratum are at least partly of native workmanship, and there are evidences of native smelting of iron. The pattern of the implements, however, is that of iron tools and weapons used in India before the beginning of the Christian era. Further evidence of traffic with India is found in the glass bangles and beads, which are of types from prehistoric finds in the south of India.

### Cancer Control Hinted

THE possibility of the long-sought control of cancer is suggested by a theory of growth promotion and inhibition by means of organic sulphur compounds, which

The oldest scientific society in the United States, the American Philosophical Society, held its annual meeting this week. Gathering in the historic hall of the society on Independence Square in Philadelphia, the members discussed topics of interest in many different scientific fields.

The American Philosophical Society was founded by Benjamin Franklin in 1772, and has counted on its roster almost all the leading scientists that the United States has produced.

was explained to the meeting by Dr. Frederick S. Hammett of the Lankenau Hospital of Philadelphia. Dr. Hammett did not advance any claim to having found a cure for cancer, but he did state that transplantable tumorous growths in mice had been caused to diminish, and in at least one case to disappear, by the application of an organic compound containing partially oxidized sulphur.

Dr. Hammett's experiments have had a much more comprehensive aim than an effort at the solution of the cancer problem. They have been endeavoring to discover the chemical secret of all growth by cell multiplication. Some time ago he stated that he had found the stimulus to cell division in the chemical group known as sulphydril, consisting of one atom of sulfur and one of hydrogen, which attaches itself to a large variety of chemical bases, including many organic and living compounds. By applying various substances containing this sulphydril group he succeeded in stimulating growth in various plant and animal tissues.

A practical application of this discovery has already been made in the medical field, Dr. Hammett stated. One of his colleagues has tried a sulphydril compound on obstinate open wounds and sores of various types, and the resulting rapid growth of new tissue has brought about the cure of a number of long-standing cases.

After he had satisfied himself that growth by cell multiplication is stimulated by sulphydril, Dr. Hammett undertook to find out why growth is checked under natural conditions. Since oxidation processes go on rapidly in growing tissues, it seemed natural to infer that the sulphydril compounds were oxidized,

and that as they added more and more oxygen to themselves they lost the power to stimulate cell division. He applied various partly-oxidized sulfur compounds to growing plant and animal tissues, as he had originally applied sulphydril compounds, and found that the oxidized substances did cause a slowing down of growth. His successful experiments on the mouse tumors followed.

### Twin Schools

AN experimental school for the testing of new methods in teaching, to be attended only by half-pairs of identical twins, while the other halves of the pairs attend a standard school as "controls," was one of the suggestions made by Dr. A. F. Blakeslee of the Carnegie Station for Experimental Evolution, Cold Spring Harbor, N. Y.

One of the difficulties of finding out anything about human beings by experimental methods, Dr. Blakeslee explained, is the usual lack of anything to check by. The chemist has his carefully purified chemicals, the botanist can take two slips off the same plant and use one of them as a "control," the zoologist can breed out irregularities in the pedigree of his stock by several generations of brother-and-sister matings. But human beings have to be taken as one finds them.

The nearest approach to control material we can get in educational or other experiments involving human beings is furnished by identical twins. These are twins who result from the division of the same original cell; they are always very similar in appearance and always of the same sex. It can be assumed therefore that if one child of such a pair comes to differ from the other to any noticeable extent it is probably due to some influence of the environment, to which one twin was subject while the other was not.

Dr. Blakeslee's suggestion is that we take advantage of this fact, by separating the usually inseparable twins for part or all of each school day. Then after a time we could judge by any differences that might develop between them what the inherent advantages or disadvantages of any proposed (Turn to page 262)





# How the Holy Family Lived In An Egyptian Small Town

*Archaeology*

By Frank Thone

**I**NTO Egypt fled Joseph and Mary and the Child, with the mad blood-lust of Herod at their heels. Once across the border they could rest, and slip into the safe obscurity of a small town, until such time as it would be possible to return to their own land. They would rent a small house, and Joseph would hunt up jobs of wood-working such as carpenters can always find, and life in exile would not be so different, after all, from life at home.

They would scarcely even be noticed as foreigners. There were no end of Jews in lower Egypt, and the arrival of another family from the North was merely something for a few bored immigration officials at the border to note down in crabbed Greek on a long-since-perished papyrus roll, before they turned back to their office gossip, forgetting the newcomers before the dust of their plodding donkey had settled in the road. When all is said, this episode in the life of Christ is and will remain obscure. Half of a terse chapter in the Gospel according to St. Matthew tells all we know about it.

But recent researches by American archaeologists in the ruins of an old Egyptian town have thrown a flood of new light on how the common people lived in the villages and small cities of Egypt during the time the Holy Family sought refuge there. Out of the dust of centuries they have dug the remains of the little houses of sun-baked brick where the folk lived their unobscure lives. They

have found door and window frames of wood, wooden stools and reading desks, wooden rakes and pitchforks—even wooden door locks with wooden keys! There evidently was no lack of work for Joseph. They have found glass dishes and woven baskets, such as Mary must have used in her house-keeping. They have even found quaint little wooden toys, oddly like modern playthings sometimes, such as Joseph might have made in his odd moments for the amusement of the little Jesus.

This is a new kind of Egyptian archaeology. The scientists of the spade have hitherto concerned themselves mostly with the relics of the great. The tombs of the nobles, the pyramids of the pharaohs, the enormous temples of the gods, with their stiff but beautiful statues, their rich treasures of gold and gems, their long and magniloquent inscriptions in picture-writing—these have been the chief documents in the history of the ancient land by the Nile that men of modern times have studied.

But history does not consist wholly of the record of the wars and wranglings of the great. There are also the laborious poor, on whose multitude of bowed backs all thrones have always been borne. What of the common people of Egypt?

This democratic view of history, which gives a sort of posthumous ballot even to the subjects of ancient absolutisms, led the Near East Research Committee of the University of Michigan to seek for a site in Egypt where kings and nobles were scarce

and where the common people had lived their common lives, had been laid away in undistinguished graves and been duly forgotten. They wanted a good, typical Egyptian small town—a mummified Main Street.

Such a place they found finally not in Egypt itself but in the Faiyum oasis. This valley of green, which lies across a naked ridge of stone hills in a basin cut down into the Libyan desert, is a sort of annex or suburb of Egypt proper. Ages ago it was carved out of the plateau by a number of tributary streams which then flowed into the Nile from the west. Finally a great lake formed in the valley.

By the time of the Old Kingdom in Egypt the lake was already below sea level but remained stationary for some time owing to increased rainfall. Later Pharaohs of the Middle Kingdom reopened the silted-up channel from the Nile and irrigated a large section of the former lake bed. Regulators controlled the inflow and possibly allowed the irrigation water to drain back into the Nile Valley.

At last, at the end of the days of native-born monarchs in Egypt, came Alexander the Great, and following him, the Macedonian house of the Ptolemies, whose long dominance ended with the fascinating but tragic Cleopatra. The lake had subsided still farther and a wide stretch of fen land intervened between its shores and the irrigated area. This region the Ptolemies brought under cultivation in one of the greatest reclamation projects carried out in ancient times.

The Greek dominance during this period of settlement has its monuments in the names of the towns: Bacchias, Dionysias, Karanis, Theadelphia, Ephemeria. There was even one city whose name has a familiar ring to American ears—Philadelphia. This Ptolemaic boom in real estate started more than two and a half centuries before the Christian era, and ended in the decline and partial abandonment of the settlements when irrigation went to wrack and ruin during the civil wars that attended the downfall of the dynasty. Twice in later days these towns experienced a similar fate, their complete desertion falling in the fifth Christian century.

Thus the task of archaeologists who would study the small-town life of Egypt at a given period of its history is simplified if they select the ruins of one of these towns in the Faiyum. It had a definite beginning and a definite end, and the situation is not complicated by finding manifold layer beneath layer of antiquity, as would be the case in almost any village in the Nile Valley proper, where the same sites have been inhabited from Neolithic times down to the present day.

The town of Karanis, which the University of Michigan expedition selected as a specimen city for its investigation, had a population of perhaps five thousand in its best days. Dr. A. E. R. Boak, who initiated the work which is still being carried on, states that he expects after further study to know exactly how many taxable people lived there during at least one period in the town's history, and even to know their names. Among the papyri recovered from the ruins are numbers of tax lists. Egyptian officialdom has held the all-time world championship in ingenuity and thoroughness of taxation schemes, and it is a pretty safe bet that no person or piece of property in Karanis ever escaped the attention of the assessors.

But without waiting for the deciphering of the tax rolls and other written records it is possible to learn a good deal about these small-town folks of long ago. The broken walls of the buildings themselves, buried in wind-drifted sand, present a story that he who digs may read.

Karanis has known three different building periods, and there are three

levels of foundations, one above the other, separated in places by layers of compact sand. The lowermost layer dates from Ptolemaic times, the middle layer from the period of Augustus and the Principate, and the upper belongs to the days of later Roman Empire. Each tells the same story: an energetic period of encouragement to agriculture and efficient administration of the irrigation system, followed by a decline into official slackness and graft, which in turn brought on popular discouragement, farm abandonment and consequent ruin of the towns. After the third death of Karanis there was no more resurrection.

But the three towns that grew successfully on the same site were very much alike, and fundamentally they were not unlike towns of similar size in mediaeval Europe, or the Maya Empire, or modern America. There was a center around which the life of the place circulated, and this was a building of stone. There were the houses and shops in which the people lived and drove their trades, and these were of less pretentious construction. Here, as elsewhere in Egypt, house construction was of sun-baked brick, much the same kind of thing we call adobe in our own Southwest. The walls were built fairly thick, and the houses were small and set closely together.

The principal building, occupying the place in the Karanian scheme of things that the county courthouse holds in our modern Main-Street towns, was the temple. The ruins of its stone walls, and a stone altar that attests to its character, have been brought to the light of day. The presence of a temple as the most pre-

tentious edifice does not argue that the people of Karanis were more pious than they were patriotic. Religion and citizenship were the same things, both in Egypt and in Rome; Pharaoh or Caesar was not only a civil ruler but a high-priest and a god in his own right.

But it is in the rooms of the houses where the people once lived, roofless now and with broken walls, that the most human and appealing chapters of the story of humble life in ancient Egypt may be read. Here are the few pieces of furniture that sufficed the simpler needs of an Oriental people. Here are the tools of field and workshop, the pots and baskets and bottles of the home, the quaint toys of the play-yard. In the empty houses where they were left when their discouraged owners moved away they lay for years untouched. The desert air is so dry that they did not decay, as such perishable stuff would have in a moister climate, and at last the roofs and walls fell in and the drifting sands completed the burial. And there they lay until the inquisitive spades of American scientists brought them up into the sunlight of a later day.

The villagers of Karanis might almost be said to have lived in an age of wood. Scores of objects that with us are made of metal are found ingeniously whittled out of timber. Perhaps the most remarkable and complicated mechanisms are the wooden door locks, opened with wooden keys. These are, to be sure, much larger affairs than the compact iron-and-brass devices that guard our own front doors. The wooden blocks that cover the sliding wooden (*Turn to page 270*)



**Laboring as their forefathers labored:** Egyptian workmen moving one of the stones of the temple by the same primitive means that the pyramid-builders used.

# Annihilation of Matter Keeps Sun Going

*Astrophysics*

## Light "Particles" Stream From Broken Atoms

**A**NNIHILATION of matter in the sun to form the energy which is radiated as heat and light is the process that keeps the sun going, Dr. C. G. Abbot, secretary of the Smithsonian Institution, said in a Science Service radio talk over the Columbia Broadcasting System.

"What supplies the sun itself with such an enormous output of energy?" Dr. Abbot asked, and answered: "Astronomers and physicists now think that the sun and all the stars are gradually consuming. I do not mean that they are burning up as coal is burned. When coal is burned it takes on oxygen, and the product in carbonic acid gas is nearly four times as heavy as the coal that is burned. Nothing like this takes place in the sun. The temperature there is so tremendous that water would turn to steam, the steam into oxygen and hydrogen, and the atoms of oxygen and hydrogen largely into electrons and protons, and all this with explo-

sive violence if any water at all could ever reach the sun.

"All chemical compounds are thus broken up in that fierce heat. We have nothing on earth so hot. Iron melted in a blast furnace would look like a black spot against the sun, and even the arc light would seem a dull red glow against such transcendent brilliance as the sun's surface. If, then, the sun is much too hot to burn, even on its surface, and perhaps ten thousands times hotter still at its center, what do we mean by that consuming that gives out its tremendous radiant energy? We mean nothing less than the annihilation of the solar substance. Take hydrogen for example. Its atom, so far as we know, consists of nothing but a separation of two units of electricity, one positive and one negative, kept apart by some tremendous energy of motion. We suppose that in the center of the sun, under prodigious pressure and exalted temperature, the two elec-

tricies may sometimes be forced together. When thus the atom ceases to exist, the energy that formerly forced its two units of electricity apart appears as radiation, and journeys outward into space."

Dr. Abbot also described new researches on the relation of plant growth to light.

"At the Smithsonian Institution we are making studies about this fascinating subject," he said. "We are growing plants out of jars of water containing suitable chemical plant foods. They stand in closed chambers where sunlight can be imitated by electric lights. We control the color of the light and seek to know just how efficient the different colored rays are to produce plant growth. Thus, without sight of sun or feel of earth, our plants are grown under exactly measured conditions. This will bring new knowledge of exactly what is necessary to make plants grow in natural surroundings. Perhaps improved varieties of useful plants may result from such studies."

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## Philosophical Society—Continued

educational methods might be. At present, having no such method of checking, we can only argue about it.

Dr. Blakeslee stated that a preliminary survey of the school population in New York City indicates that there is a sufficient number of identical twins to fill a special "twin school," if the funds can be found to operate it. He suggested that for such a double school it would be desirable to obtain pairs of teachers who are themselves identical twins, so that the "control" method might be extended as far as possible.

## Ancestry of Lowest Fish

**A** FOSSIL "missing link" with an existing creature that looks like a missing link itself was described by Dr. W. B. Scott, professor of geology at Princeton University.

One of the most puzzling of existing animal forms, Dr. Scott said, is the hagfish or lamprey-eel. In spite of the piscine suggestion in its name it is not really a fish but a sort of remote relation of the fishes, and a very poor relation at that. It has no eyes, no scales, no fins, no jaws,

not even any bones. Its mouth is a mere sucking circle, armed with sharp horny teeth. One of the world's leading authorities on fishes once expressed the opinion that it had no long ancestry, but reached its present low estate in comparatively recent times through degenerative evolution.

But fossils recently discovered in Norway and studied by Dr. Scott now produce evidence that these humble fishlike creatures have a lineage as ancient as that of any higher animal. The Norwegian stones from Silurian formations, much older than the Coal Age, show a creature possessing many of the characters of a modern lamprey-eel, but decidedly more primitive in structure.

Interestingly enough, however, these ancient creatures had well-developed scales, as well as incipient traces of fins. But there is no evidence that they had any bones, and they had no teeth. The pineal gland, which was once a third eye, opened to the surface on the middle line of the head, whereas in the modern lamprey-eel it is buried under the skin and other tissues.

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A centipede usually has about twenty legs, although its name indicates that it has a hundred.

It has been found that salmon contains the vitamin that prevents the disease of pellagra.

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# Next U. S. Eclipse Will Be in 1932

Astronomy

## This Will Be Total for Northeast Part of Country

AMERICANS who miss the eclipse of the sun in California on April 28 will only have to wait a few years—until the afternoon of August 31, 1932—for another. Then a total eclipse will be visible along a path about a hundred miles wide, crossing northeastern Vermont, all of New Hampshire but the southwestern corner, southwestern Maine, the northeastern corner of Massachusetts in the vicinity of Gloucester, and Cape Cod.

This will be much better astronomically than the one on April 28, for it will last more than a minute and a half, instead of the second and a half this month. The path will be wide enough that astronomers will not have to worry about being on it, as they must now. Already Dr. Frederick Slocum, of the Van Vleck Observatory at Middletown, Conn., has made a study of weather conditions at this time of year, and finds that interior Maine, at such places as Hiram, East Baldwin and West Buxton, offer some of the best chances. Probably these towns will be a mecca for the world's astronomers at that time, for the International Astronomical Union will hold its first American meeting immediately afterwards. In fact, the meeting would ordinarily have been held in 1931, but was postponed a year in order to permit astronomers from foreign lands to combine the eclipse and meeting.

However, some American astronomers will have a chance to see the sun eclipsed without waiting for two years. On October 21 of this year a path of totality will cross the south Pacific. A tiny island, Niuaufu, in the Tonga group, is the only accessible land on the path. Dr. S. A. Mitchell, of the University of Virginia, a veteran eclipse observer, will head an expedition there under the sponsorship of the U. S. Naval Observatory.

After 1932, the next eclipse seen in the United States is on August 9, 1945, but it will only be visible at sunrise in Montana. Thence it travels northeastward across Canada, where astronomers may observe it. In 1954, on June 30, one begins in Nebraska, and travels to the northeast over Lake Superior, the southern end of Hudson Bay and Labrador. Probably this will be well observed. On March 7, 1970, one crosses Florida. As this is near

August 31, 1932

August 9, 1945

November 1, 1951

June 30, 1954

October 2, 1959

March 7, 1970

May 30, 1984

May 10, 1994

May 20, 2012

August 21, 2017

April 30, 2022

October 14, 2023

\*Best eclipses, probably will be observed by astronomers in America.

## Coming Eclipses in United States

\*Path crosses Vermont, New Hampshire, Maine and Massachusetts.

Begins in Montana and Idaho at sunrise and passes north-eastward across Canada.

Begins at North Carolina coast and travels eastward, possibly visible on land at sunrise.

\*Begins in Nebraska at sunrise, thence northeastward, crossing Lake Superior and Canada.

Begins near Long Island at sunrise and travels eastward over Atlantic. Possibly visible in New York.

\*Crosses Florida.

\*Central eclipse; total across Mexico and southeastern United States, leaving the coast near Maryland.

Annular eclipse, path crosses United States from California to Maine.

Annular eclipse; crosses from California to Texas.

\*Crosses the country from California to North Carolina, one of the best in the coming century.

\*Crosses from Texas to New Jersey.

Annular eclipse, path crosses southern California.

the middle of the path, there will probably be a number of astronomers watching it.

May 30, 1984, brings another central eclipse, like the one this month, but the total part of the path is longer and wider. Then the total eclipse will be visible along a path crossing Mexico and the southeastern states, going to sea near Maryland.

On May 10, 1994, an annular eclipse will cross the entire country from California to Maine, though as the moon will not completely conceal the bright solar disc, but will leave a ring of light around it, astronomers will probably not give it much attention. It will, however, be an interesting

spectacle, so you might put the date down in your calendar. In 2012 another eclipse occurs on May 20, visible along a path from California to Texas.

The year 2017 brings one of the best American eclipses in the coming century, for then the path of totality sweeps squarely across the country from California to North Carolina. This occurs on August 21, and the path will probably be dotted with the super-telescopes that astronomers of that distant date will enjoy.

Another annular eclipse, on October 14, 2023, visible along a band across southern California, completes the American eclipses of the next century.

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## Flowers From Steel

Metallurgy

THE same fascinating sparks that the village children used to watch "flying like chaff from a threshing floor" are now used to save industry thousands of dollars, for they have been found to be an index to the many kinds of modern steels which differ from one another only slightly in carbon or alloy content.

When held against a flying grindstone a steel containing only 15 hundredths of one per cent. carbon gives a shower of slender spearlike sparks, while a one per cent. carbon steel yields a much fuller shower with many small branches, remindful of a bunch of flowers of pure white stems, leaves

and blossoms. Similarly the different alloy elements like molybdenum, nickel and chromium leave a characteristic impression upon a steel's spark.

Characteristic sparks from a one per cent. steel are shown on the cover.

These differing sparks and their causes are being studied at Canton, Ohio, by Walter G. Hildorf and C. H. McCollam, metallurgists of the Timken Tube and Steel Co., and their findings are already in use in many plants. Spark testing, as the method is called, has provided a cheap and rapid means of sorting different grades of steel which it is almost impossible to tell apart from outward appearance.

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## Plant Bites Bug

If a bug bites a plant, that's old stuff, but if a plant bites a bug, that's news. Good news, too, for the bug that gets bitten is the larva, or "wiggler" of the pestiferous mosquito.

In a report to *The American Naturalist*, Prof. Robert Matheson of Cornell University, tells of his investigations on various plants that are enemies of breeding mosquitoes, including one species of water-weed that actually swallows and digests their young. This is the bladderwort, or *Utricularia*. On its underwater roots there are thousands of tiny hollow green globes, each opening at one end in a little mouth fringed with hair-like appendages.

These globes are under internal tension, and when a "wiggler" brushes against one of the hairs the mouth suddenly flies open and sucks the luckless insect in. Within the bladder it quickly dies and is digested as though it were in an animal's stomach.

Prof. Matheson has also found that other genera of water plants, particularly the attractive members of the *Chara* family, in some way kill off most of the mosquito larvae that may find their way into the ponds they inhabit. Some of them even seem to discourage the female mosquito from laying her eggs at all.

Just what these plants do to the "wigglers" he has not found out, but he is inclined to believe that the action is due largely to the innumerable tiny bubbles of oxygen given off by them during the daylight hours. The oxygen either destroys the food they seek in the water, or else is swallowed and acts directly on the larvae themselves, Prof. Matheson conjectures.

*Botany*

*Science News-Letter, April 26, 1930*

## Roman Factory at Cologne

A pottery works that flourished during the days of Roman occupation of the Rhineland about the year 50 A.D., is among the archaeological finds turned up by the Wallraf-Richartz Museum in Cologne, under the directorship of Dr. F. Fremersdorf. All stages of the manufacture of the wares were discovered, from the raw clay fresh from the pits to finished pieces, as well as vessels that were damaged in the firing and therefore discarded. Some 120 cases of pottery have been removed to the museum for scientific study.

One very important class of earthenware sold by the merchants of Cologne during Roman times consisted

of lamps of all forms and sizes. The finds include both oil lamps and candlesticks, variously glazed and ornamented. A prize piece is a beautifully preserved lamp shaped like a human foot.

It was also discovered that two types of ware, which had formerly been considered importations from northern Italy or southern France, were manufactured in Cologne. One is a green-glazed type of pottery, the other a pattern of beaker decorated with hunting scenes.

*Archaeology*

*Science News-Letter, April 26, 1930*

## New Magazine

The photoelectric cell and the vacuum tube, developments that have made radio and talking motion pictures possible and have found many industrial applications, are the sole subjects of a new magazine, "electronics." Its title begins with a small e, not because of modernistic topography, but because e is the symbol in physics for the charge of the electron, fundamental to matter and electricity.

The new magazine is edited by O. H. Caldwell, formerly editor of an electrical and a radio trade magazine and Federal Radio Commissioner from 1927 to 1929.

*Physics*

*Science News-Letter, April 26, 1930*

## Hydraulic Laboratory

A great national hydraulic laboratory, the first duty of which will be to discover scientific principles essential to the construction of Boulder Dam, will be built at the U. S. Bureau of Standards if President Hoover signs the bill recently passed by Congress. No opposition is expected at the White House.

Boulder Dam will be nearly twice as high as any dam now in existence and will contain more than three times the concrete in the immense Muscle Shoals Dam and power house. Engineers do not know every detail of the building of such a huge dam so unlike anything man has ever created. Experiments must be conducted and ideas tried in the laboratory first to be sure they work before construction is begun.

The engineers must find, for example, how to design spillways which, if ever used to their capacity, will have to absorb about seven times the power in the falls at Niagara. These spillways will be like huge funnels with rims 150 feet and shafts 50 feet in diameter down which the water will fall more than 500 feet.

# IN VARIOUS CI

Problems of flood control on the Mississippi are now being studied by the Water Experiment Station of the Mississippi River Commission at Vicksburg. Functions of this laboratory and the one for Washington will not overlap, it has been explained, and there will be more than enough work for both.

The Bureau of Standards laboratory will become a national research institution in a field which has been only slightly investigated in the United States and in which private concerns are not prompted to pioneer because much of the large hydraulic construction is carried on by the government. It will cost \$350,000.

*Hydraulic Engineering*

*Science News-Letter, April 26, 1930*

## Anglemorm Big as Snake

If you happen to be in the Philippine mountains some day, and see an anglemorm as big as a small snake, colored bright blue with pale yellow spots and bandings, don't blame it on something you have eaten (or drunk) in the last village. It's real, and it's there, although it is a zoological rarity. Dr. M. Michaelson, of Hamburg, Germany, has just reported to the *Philippine Journal of Science* on specimens collected in Luzon some time ago and forwarded to him by a fellow-countryman, W. Schultze, formerly an entomologist at the Bureau of Science in Manila. The specimens when living were over a foot in length and nearly an inch in greatest diameter. They are of a species new to science and have been named *Pheretima ophioides*.

*Zoology*

*Science News-Letter, April 26, 1930*

## Parrot Fever Work

The U. S. Public Health Service's investigation on psittacosis or parrot fever, which has been suspended for a month on account of sickness of many members of the Hygienic Laboratory staff who contracted the disease, will be resumed shortly at the Baltimore Quarantine Station, just outside the city of Baltimore, Surgeon General Hugh S. Cumming has announced.

Dr. George W. McCoy, director of the Hygienic Laboratory, and Dr. Charles Armstrong, who had been conducting the investigations until he fell a victim to the disease, are now making arrangements for the resump-



# SCIENCE FIELDS

tion of the work in the new location. The removal of this part of the Hygienic Laboratory's work was made on the recommendation of a special committee appointed by the Surgeon General to study the situation after eleven persons working at the laboratory had been stricken with the disease.

The fact that most of those who became ill had not been anywhere near the rooms where the psittacosis studies were going on, and had no contact with the infected parrots or with the cultures of the germs suspected of causing the disease, has added to the mystery and danger of this particular disease.

The question of a carrier state was brought up in this connection, and will be investigated when the work is resumed at the Baltimore Quarantine Station. A virus which was obtained just before the work was suspended is thought to be the cause of the disease. Confirmation of this will be part of the work. The susceptibility of other species of birds and animals to this disease which attacks both man and parrots will also be studied.

*Public Health*

*Science News-Letter, April 26, 1930*

## Why a Chicken Jerks

Why does a chicken jerk its head when it runs? No, this isn't a riddle. It's a psychological problem, and the answer is, so that it can see better.

Experiments which explain this peculiar behavior of barnyard inhabitants were reported by Dr. Knight Dunlap and O. H. Mowrer, of Johns Hopkins University, speaking before the Southern Society for Philosophy and Psychology. Slow motion pictures of chickens, ducks, pigeons, and starlings were shown.

Contrary to all appearances, the chicken's head does not really move back and forth. The head jerks forward only. The body catches up. Then the head jerks forward again, and so on, Dr. Dunlap explained. If a chicken is hooded, its head no longer tries to keep one jump ahead of its body.

The obvious function of this jerking is to cut off vision during a part of the head movement, he said. This prevents blurring and gives the chicken a succession of clear pictures.

When swimming, ducks and swans do not jerk the head, but the entire body moves forward smoothly. Investigations of the walking motions of water-fowls are not completed, Dr. Dunlap said, but ducks appear to have a kind of head movement which is in some respects just the opposite of the chicken's.

*Animal Psychology*

*Science News-Letter, April 26, 1930*

## Night Landing

An aviator coming to earth through a dark sky can see a landing field covered with whitewashed crushed stone 15 times as well as he can see one paved with asphalt, aviation lighting engineers of the General Electric Co. report. To light both fields equally well, 15 times as much light is required for the asphalt as for the rock, they point out.

Many surfaces have been tested and given a reflection factor. The stone reflects 75 per cent. of the light it receives and the asphalt reflects five. For Portland cement the figure is 30 per cent.; for crushed stone, 25; crushed slag, gravel and clay soil 20; sandy soil, 10 to 12; cinders, five to 10; black soil, five to eight; and asphalt, five.

*Aviation*

*Science News-Letter, April 26, 1930*

## Rehabilitation

A practical way of helping girls with not-too-serious mental diseases to get back into the workaday world has been devised by the Vocational Adjustment Bureau of New York. Dr. Emily Burr, director of the bureau, explained how the project works.

Many girls suffering from various mild nervous disorders are capable of returning to work after treatment in a state hospital, but a sudden change from sheltered hospital environment to the strain of everyday life and industrial competition is too great for most of them, Dr. Burr explained. To bridge this trying and often devastating gap, the bureau conducts a laboratory workshop, where the girls may experiment for themselves at different lines of work, and may get used to employment conditions again.

Out of about 400 individuals who have been given a chance to fit themselves for work in the experimental shop, approximately one-third are now making a living and are considered in psychological terms to be "making fair industrial adjustments."

*Psychiatry*

*Science News-Letter, April 26, 1930*

## Barkbeetles Blamed

Blue stain is one of the most troublesome of timber ills in the South. A variety of it that attacks standing trees is found to depend for its entrance on an insect, one of the barkbeetles, in somewhat the same way as malaria and yellow fever have been traced to the guilty carrying activities of mosquitoes. Blue stain is due to the growth of certain fungi which discolor the wood and lower its market value; and it now appears that some of these organisms are active agents in the killing of pine trees.

The hooking up of the barkbeetle and the blue stain fungus, each of which has been well known for some time as a serious pest in its own right, has been the work of three scientists in the U. S. Department of Agriculture, Dr. F. C. Craighead, R. M. Nelson and J. A. Beal. Dr. Craighead called especial attention to the fact that an onset of blue stain in a tree almost invariably followed a mass attack by small beetles, of the genus *Dendroctonus*, boring holes through the bark and mining galleries in the living inner bark tissue in which to lay their eggs. The blue stain started from these borings and in a short time the tree died, presumably through choking up the sap-carrying tubes.

Mr. Nelson and Mr. Beal demonstrated that the blue stain fungus can be planted in the wood of the tree through wounds, such as the barkbeetle bores. They made artificial cultures of the fungus on sterilized rice paste, and brought this paste into contact with the wood of undiseased trees in various ways. From some trees they removed squares of bark, replacing them with poultices of the culture-paste. Other trees had holes bored in them and filled with the paste, and in still others the paste was planted by means of a grease gun. Typical blue stain infections developed as a result of all three types of inoculation.

Whether the association of barkbeetles and blue stain is accidental, or whether the beetles get any benefit from the fungus, is something not yet determined. Dr. Craighead has pointed out that other beetles belonging to the same zoological group depend entirely for food on certain fungi that grow in their burrows. Or it may be that the benefits derived by the barkbeetles are less direct; perhaps the best conditions for rearing their young are found in trees of just the stage of "deadness" induced by the fungus.

*Entomology*

*Science News-Letter, April 26, 1930*

# Beginnings of Ether as Anesthetic

Medicine

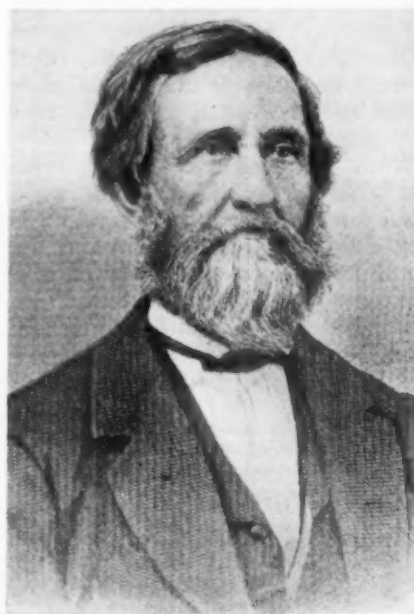
*DR. LONG'S ORIGINAL PAPER. Read before Georgia State Medical Society in 1852. Reprinted in Johns Hopkins Hospital Bulletin No. 78. Baltimore, 1896-97.*

IN the month of December, 1841, or January, 1842, the subject of the inhalation of nitrous oxide gas was introduced in a company of young men assembled at night in the village of Jefferson, Ga., and the party requested me to prepare them some. I informed them I had not the requisite apparatus for preparing or preserving the gas, but that I had an article (sul. ether) which would produce equally exhilarating effects and was as safe. The company were anxious to witness its effects, the ether was introduced and all present in turn inhaled. They were so much pleased with its effects that they afterwards frequently used it and induced others to do the same, and the practice soon became quite fashionable in the country and some of the contiguous counties.

On numerous occasions I inhaled ether for its exhilarating properties, and would frequently, at some short time subsequent to its inhalation, discover bruised or painful spots on my person which I had no recollection of causing and which I felt satisfied were received while under the influence of ether. I noticed my friends while etherized received falls and blows which I believed were sufficient to produce pain on a person not in a state of anæsthesia, and on questioning them they uniformly assured me that they did not feel the least pain from these accidents. Observing these facts I was led to believe that anæsthesia was produced by the inhalation of ether, and that its use would be applicable in surgical operations.

The first patient to whom I administered ether in a surgical operation was Mr. James M. Venable, who then resided within two miles of Jefferson, and at present lives in Cobb Co., Ga. Mr. Venable consulted me on several occasions in regard to the propriety of removing two small tumors situated on the back part of his neck, but would postpone from time to time having the operation performed, from dread of pain. At length I mentioned to him the fact of my receiving bruises while under the influence of the vapor of ether without suffering, and as I knew him

Dr. Crawford Long of Georgia discovered the anesthetic effects of ether while trying out its action as an intoxicant, but, recognizing the value of the properties he had found, he made, in 1842, a series of carefully controlled observations of its value in surgery. Due to his infrequent surgical cases and his determination to make certain of results that seemed too good to be true, the publication of these results, ten years later, came after the report from the Massachusetts General Hospital.



to be fond of and accustomed to inhale ether, I suggested to him the probability that the operations might be performed without pain, and proposed operating on him while under its influence. He consented to have one tumor removed, and the operation was performed the same evening. The ether was given to Mr. Venable on a towel, and when fully under its influence I extirpated the tumor.

It was encysted and about half an inch in diameter. The patient continued to inhale ether during the time of the operation, and when informed it was over, seemed incredulous until the tumor was shown him.

He gave no evidence of suffering during the operation, and assured me, after it was over, that he did not experience the least degree of pain from its performance. The operation was performed on the 30th March, 1842.

The second I performed on a patient etherized was on the 6th June, 1842, and was on the same person,

for the removal of the other small tumor. This operation required more time than the first, from the cyst of the tumor having formed adhesions to the adjoining parts.

The patient was insensible to pain during the operation until the last attachment of the cyst was separated, when he exhibited signs of slight suffering, but asserted after the operation was over that the sensation of pain was so slight as scarcely to be perceived. In this operation the inhalation of ether ceased before the first incision was made. Since that time I have invariably desired patients, when practicable, to continue the inhalation during the time of the operation.

Having permitted such a length of time to elapse without making public my experiments in etherization, in order to show the correctness of my statements I procured the certificate of the patient on whom the first operation was performed, the certificate of two who were present at the time of the operation, and also those of his mother, brothers and sisters and a number of friends who heard him speak of the operations soon after they were performed. The Southern Medical and Surgical Journal contained but two of the certificates. I have a number of others which can be seen or read if desired by the Society. My third case was a negro boy who had a disease of a toe which rendered amputation necessary, and the operation was performed July 3rd, 1842, without the boy evincing the slightest sign of pain.

These were all the surgical operations performed by me during the year 1842 upon patients etherized, no other case occurring in which I believed the inhalation of ether applicable. Since '42 I have performed one or more surgical operations annually, on patients in a state of etherization.

I procured some certificates in regard to these operations, but not with the same particularity as in regard to the first operations, from the fact of my sole object in the publication being to establish my claim to priority of power of ether to produce anæsthesia. However, these certificates can be examined.

The reasons which influenced me in not publishing earlier are as follows:

I was anxious, (turn to page 268)



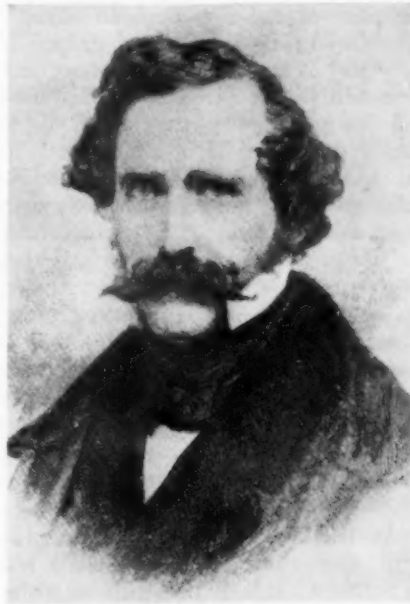
## — Two Classics of Science

**INSENSIBILITY DURING SURGICAL OPERATIONS PRODUCED BY INHALATION.** Read before the Boston Society of Medical Improvement, November 9, 1846, an abstract having been previously read before the American Academy of Arts and Sciences, November 3, 1846. By Henry Jacob Bigelow, M. D., one of the Surgeons of the Massachusetts General Hospital. In the *Boston Medical and Surgical Journal* Vol. XXXV, No. 16. Wednesday, November 16, 1846.

IT has long been an important problem in medical science to devise some method of mitigating the pain of surgical operations. An efficient agent for this purpose has at length been discovered. A patient has been rendered completely insensible during an amputation of the thigh, regaining consciousness after a short interval. Other severe operations have been performed without the knowledge of the patients. So remarkable an occurrence will, it is believed, render the following details relating to the history and character of the process, not uninteresting.

On the 16th of October, 1846, an operation was performed at the hospital, upon a patient who had inhaled a preparation administered by Dr. Morton, a dentist of this city, with the alleged intention of producing insensibility to pain. Dr. Morton was understood to have extracted teeth under similar circumstances, without the knowledge of the patient. The present operation was performed by Dr. Warren, and though comparatively slight, involved an incision near the lower jaw of some inches in extent. During the operation the patient muttered, as in a semi-conscious state, and afterwards stated that the pain was considerable, though mitigated; in his own words, as though the skin had been scratched with a hoe. There was, probably, in this instance, some defect in the process of inhalation, for on the following day the vapor was administered to another patient with complete success. A fatty tumor of considerable size was removed, by Dr. Hayward, from the arm of a woman near the deltoid muscle. The operation lasted four or five minutes, during which time the patient betrayed occasional marks of uneasiness; but upon subsequently regaining her consciousness, professed not only to have

Scientific discoveries never come singly. The North and the South share honors in the American discovery that inhalation of ether makes one insensible to pain. Dr. Morton, a New England dentist, in 1846 persuaded surgeons of the Massachusetts General Hospital to try out his method of deadening pain. They were so impressed with the new boon to the human race that one of them reported the results to his colleagues and published the account in a scientific journal.



felt no pain, but to have been insensible to surrounding objects, to have known nothing of the operation, being only uneasy about a child left at home. No doubt, I think, existed, in the minds of those who saw this operation, that the unconsciousness was real; nor could the imagination be accused of any share in the production of these remarkable phenomena. . . .

It remains briefly to describe the process of inhalation by the new method, and to state some of its effects: A small two-necked glass globe contains the prepared vapor, together with sponges to enlarge the evaporating surface. One aperture admits the air to the interior of the globe, whence, charged with vapor, it is drawn through the second into the lungs. The inspired air thus passes through the bottle, but the expiration is diverted by a valve in the mouth piece, and escaping into the apartment is thus prevented from vitiating the medicated vapor. A few of the ope-

rations in dentistry, in which the preparation has as yet been chiefly applied, have come under my observation. The remarks of the patients will convey an idea of their sensations.

A boy of 16, of medium stature and strength, was seated in the chair. The first few inhalations occasioned a quick cough, which afterwards subsided; at the end of eight minutes the head fell back, and the arms dropped, but owing to some resistance in opening the mouth, the tooth could not be reached before he awoke. He again inhaled for two minutes, and slept three minutes, during which time the tooth, an inferior molar, was extracted. At the moment of extraction the features assumed an expression of pain, and the hand was raised. Upon coming to himself he said he had had a "first-rate dream—very quiet," he said, "and had dreamed of Napoleon—had not the slightest consciousness of pain—the time had seemed long"; and he left the chair, feeling no uneasiness of any kind, and evidently in a high state of admiration. The pupils were dilated during the state of unconsciousness, and the pulse rose from 130 to 142.

A girl of 16 immediately occupied the chair. After coughing a little, she inhaled during three minutes, and fell asleep, when a molar tooth was extracted, after which she continued to slumber tranquilly during three minutes more. At the moment when force was applied she flinched and frowned, raising her hand to her mouth, but said she had been dreaming a pleasant dream and knew nothing of the operation.

A stout boy of 12, at the first inspiration coughed considerably, and required a good deal of encouragement to induce him to go on. At the end of three minutes from the first fair inhalation, the muscles were relaxed and the pupil dilated. During the attempt to force open the mouth he recovered his consciousness, and again inhaled during two minutes, and in the ensuing one minute two teeth were extracted, the patient seeming somewhat conscious, but upon actually awaking he declared "it was the best fun he ever saw," avowed his intention to come there again, and insisted upon having another tooth extracted upon the spot. A splinter which had been left, afforded an opportunity of complying with his wish, but the pain proved to be (Turn to next page)



## Morton's Work on Ether—Continued

considerable. Pulse at first 110, during sleep 96, afterwards 144; pupils dilated.

The next patient was a healthy-looking, middle-aged woman, who inhaled the vapor for four minutes; in the course of the next two minutes a back tooth was extracted, and the patient continued smiling in her sleep for three minutes more. Pulse 120, not affected at the moment of the operation, but smaller during sleep. Upon coming to herself, she exclaimed that "it was beautiful—she dreamed of being at home—it seemed as if she had been gone a month." These cases, which occurred successively in about an hour, at the room of Dr. Morton, are fair examples of the average results produced by the inhalation of the vapor, and will convey an idea of the feelings and expressions of many of the patients subjected to the process. Dr. Morton states that in upwards of two hundred patients, similar effects have been produced. The inhalation, after the first irritation has subsided, is easy, and produces a complete unconsciousness at the expiration of a period varying from two to five or six, sometimes eight minutes; its duration varying from two to five minutes; during which the patient is completely insensible to the ordinary tests of pain. The pupils in the cases I have observed have been generally dilated; but with allowance for excitement and other disturbing influences, the pulse is not affected, at least in frequency; the patient remains in a calm and tranquil slumber, and wakes with a pleasurable feeling. The manifestation of consciousness or resistance I at first attributed to the reflex function, but I have since had cause to modify this view.

It is natural to inquire whether no accidents have attended the employment of a method so wide in its application, and so striking in its results. I have been unable to learn that any serious consequences have ensued. One or two robust patients have failed to be affected. I may mention as an early and unsuccessful case, its administration in an operation performed by Dr. Hayward, where an elderly woman was made to inhale the vapor for at least half an hour without effect. Though I was unable at the time to detect any imperfection in the process, I am inclined to believe that such existed. One woman became much excited, and required to

be confined to the chair. As this occurred to the same patient twice, and in no other case as far as I have been able to learn, it was evidently owing to a peculiar susceptibility. Very young subjects are affected with nausea and vomiting, and for this reason Dr. M. has refused to administer it to children . . .

The process is obviously adapted to operations which are brief in their duration, whatever be their severity. Of these, the two most striking are, perhaps, amputations and the extraction of teeth. In protracted dissections, the pain of the first incision alone is of sufficient importance to induce its use; and it may hereafter prove safe to administer it for a length of time, and to produce a narcotism of an hour's duration. It is not unlikely to be applicable in cases requiring a suspension of muscular action; such

as the reduction of dislocations or of strangulated hernia; and finally it may be employed in the alleviation of functional pain, of muscular spasm, as in cramp and colic, and as a sedative or narcotic.

It is natural to inquire with whom this invention originated. Without entering into details, I learn that the patent bears the name of Dr. Charles T. Jackson, a distinguished chemist, and of Dr. Morton, a skilful dentist, of this city, as inventors—and has been issued to the latter gentleman as proprietor.

It has been considered desirable by the interested parties that the character of the agent employed by them, should not be at this time announced; but it may be stated that it has been known to these gentlemen who have had occasion to avail themselves of it.

*Science News-Letter, April 26, 1930*

## Long's Paper—Continued

before making my publication, to try etherization in a sufficient number of cases to fully satisfy my mind that anæsthesia was produced by the ether, and was not the effect of the imagination or owing to any peculiar insusceptibility to pain in the persons experimented on.

At the time I was experimenting with ether there were physicians high in authority and of justly distinguished character who were the advocates of mesmerism, and recommended the induction of the *mesmeric state* as adequate to prevent pain in surgical operations. Notwithstanding thus sanctioned I was an unbeliever in the science, and of the opinion that if the mesmeric state could be produced at all it was only on those of strong imaginations and weak minds, and was to be ascribed solely to the workings of the patient's imagination. Entertaining this opinion, I was the more particular in my experiments in etherization.

Surgical operations are not of frequent occurrence in a country practice, and especially in the practice of a young physician, yet I was fortunate enough to meet with two cases in which I could satisfactorily test the anæsthesia power of ether. From one of these patients I removed three tumors the same day; the inhalation of ether was used only in the second operation, and was effectual in preventing pain, while the patient suffered severely from the extirpation of

the other tumors. In the other case I amputated two fingers of a negro boy; the boy was etherized during one amputation and not during the other; he suffered from one operation and was insensible during the other.

After fully satisfying myself of the power of ether to produce anæsthesia, I was desirous of administering it in a severer surgical operation than any I had performed. In my practice, prior to the published account of the use of ether as an anæsthetic, I had no opportunity of experimenting with it in a capital operation, my cases being confined, with one exception, to the extirpation of small tumors and the amputation of fingers and toes.

While cautiously experimenting with ether, as cases occurred, with the view of fully testing its anæsthetic powers and its applicability to severe as well as minor surgical operations, others more favorably situated engaged in similar experiments and consequently the publication of etherization did not "bide my time."

I know that I deferred the publication too long to receive any honor from the priority of discovery, but having by the persuasion of my friends presented my claim before the profession, I prefer that its correctness be fully investigated before the Medical Society. Should the society say that the claim, though well founded, is forfeited by not being presented earlier, I will cheerfully respond, so mote it be.

*Science News-Letter, April 26, 1930*

# German "Subs" Armored With Mirrors

*Military Engineering*

## Bouncing Grenades Also Among Wartime Devices

By Dr. Maxim Bing

PERISCOPES encased in mirrors to make them invisible, bomb-releasing gondolas hung thousands of feet beneath their parent Zeppelins, rifle grenades that bounced into the air before exploding, were among the military devices used by the Central Powers during the World War. The tale of these martial inventions has just been told in a lecture at Berlin by an Austrian engineer, Otto Gergacsevs, formerly captain in the Austrian technical forces and holder of over a hundred patents.

During the war it was a favorite "wisecrack" that the English could never see a submarine because the Germans painted a joke on it. As a result of Capt. Gergacsevs' disclosures, it is now known that the concealing device was even more transparent than this. The end of the periscope was sheathed in a 16-faced prism of mirrors. These reflected the waves, and provided the most perfect possible concealing camouflage.

But even with the periscope thus "armored" in invisibility-providing mirrors, it still betrayed its presence by the streak of broken water it caused even when the boat was cruising at low speed, and at full speed it would often throw a wave four feet high and some sixty feet long.

This was overcome by placing around the periscope shaft a sliding float of streamline shape, that permitted the water to close in evenly astern and thus do away with the long ripple. A deflecting plate on top of the float prevented the rising of a bow wave. Two common football bladders within the float became filled with water when the U-boat submerged, preventing the outside water pressure from collapsing the float.

So effective was this device in preventing the betraying white wave that it was possible for a submarine to approach within 125 yards of an enemy ship without being detected. Word went around among the Allies that the Germans had devised a means of using submarines without employing periscopes.

An equally effective device was used with the Zeppelins. From the great height the Zeppelins were obliged to keep, to avoid the shells of the defend-

ing guns, it was well nigh impossible to do any proper aiming. Thus the bombs dropped often hit private houses, while objects of military importance were missed.

This difficulty was finally overcome by an invention of Capt. Gergacsevs. On a cable 2,000 yards long auxiliary gondolas were suspended from the body of the airship. They were lowered when in action, so that they were only a hundred meters above the ground. Through the cable, electric current was supplied to the small gondola, which had a propeller of its own revolved by a noiseless electric motor.

The auxiliary gondola was able to travel around a circle of two kilometers diameter. The gondola was clad in chrome nickel plates, proof against rifle fire. Its exterior was so highly polished that it acted as a mirror, reflecting the clouds and the ground only as a narrow line, thus becoming well-nigh invisible.

Within the gondola an observer lay flat on his chest, directing the circular motion of his little craft by a small rudder, and dropping the bombs by a

catch working from the inside. The airship kept above the clouds. After the action, the gondola was hauled up again. The Zeppelin raids, were finally suppressed by the Allies, through the invention of an ignition bullet, fired from rifles and machine guns. Capt. Gergacsevs nevertheless believes that by filling the Zeppelins with helium and by operating the gondolas with radio waves, the giant airships can still be made formidable weapons.

Another invention of Capt. Gergacsevs was a bouncing rifle grenade. The ordinary rifle grenade, upon falling, would usually bury its head in the earth and explode mainly upward, with very little effect. The Austrian inventor developed a grenade which, upon striking the ground, was thrown back into the air by a small auxiliary charge. After one or more of such explosive bounces the main charge would be detonated, with much greater effect than it would have had if the explosion had been close to the ground. The inventor also provided a noiseless pneumatic gun for throwing this formidable weapon.

*Science News-Letter, April 26, 1930*

## Trees Have Ancient Lineage

*Botany*

A plea for a "more general appreciation of the wonders of the past history and present beauty of trees" instead of the "attitude that regards our forests as so many potential board feet" was made by Edward W. Berry, dean of the College of Arts and Sciences of Johns Hopkins University, speaking in a Science Service radio talk over the Columbia Broadcasting System.

"We need not grow sentimental about 'woodman, spare that tree,'" declared Dean Berry, "but nevertheless fire and the lumberman have worked more havoc with the forests in a few hundred years than all of the natural vicissitudes of time. We might remember that a tree is no longer a tree when it is lumber."

"Some of us take great pride in our ancestry, and everyone in these days when evolution is so much discussed has heard at least something of the ancestry of man and of the lower animals," he said. "Few, however, even among lovers of flowers and

trees, have given much thought to the possibility of our favorite trees having had ancestors, or that the evolution of plants is quite as fascinating a field of study as is the field of animal evolution.

"The stage setting is the same for plants as for animals only the time involved is somewhat longer. Plants are essentially the gatherers and storers of energy while animals are essentially expenders of energy. Consequently animals must have plants for food. Hence plants were the first organisms.

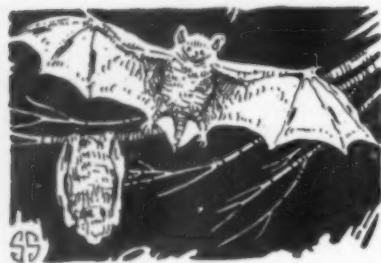
"The latest fraction of earth history, which we call the Tertiary period, comprises—according to recent studies of the atomic disintegration of uranium and thorium minerals—something like 60,000,000 years. This period is commonly called the Age of Mammals since it is during this time that the mammals or warm blooded animals underwent their main evolution which culminated in the anthropoid apes and in man."

*Science News-Letter, April 26, 1930*



## NATURE RAMBLINGS

By Frank Thone

*Bats Awakening*

WHEN we talk of animals coming out of hibernation in the spring, we usually think of bears and squirrels, and that semi-legendary creature so important on February 2, the groundhog.

But there are other animals whose winter sleep is coming to an end, and when they come out of their caves they come a-flying. Literally flying, for they are winged. Bats hibernate, as do their heavier-bodied brethren who have to go afoot all their lives. There isn't anything else for them to do, if they want to survive the winter at all. Bats, at least all non-tropical bats, are insect-eaters and catch their prey on the wing. Since there are no insects awing in winter it is up to the bats to figure out the best way to spend the long winter evenings, and for creatures that cannot read, or play checkers, or listen to the radio the best thing to do is sleep. So they sleep, in long festoons within dark caves or deserted buildings.

There is one superstition about bats, held principally by women, that dies hard. They think that a low-flying bat is likely to get tangled in their hair. Even in these modern times of enlightenment and bobbed hair, women still duck and writhe uneasily when one of these noiselessly-flitting little animals swoops too near.

As a matter of fact, no bat ever collides with anything when it is flying. No matter how dark it may be, the bat always avoids all obstacles, even such slender things as twigs and wire. It is hardly possible that the animals can see these things in the dusk, but it is not known definitely how they become aware of them in time to swerve. Most naturalists conjecture that this uncanny power of locating things in the dark is due to specialized and highly developed organs of hearing.

*Science News-Letter, April 26, 1930*

## Small Towns in Ancient Egypt—Continued

bolts are half the size of a common brick, and the keys are six or eight inches long. But apparently they served their purpose.

More orthodox in appearance are wooden hayforks, carding combs, spindles, door frames. A curious piece of furniture is a wooden reading desk. This is in the shape of a wide but shallow trough. The two boards that form its top meet in the middle to form a wide "V", which prevented the rolls of papyrus that were the commonest books of that day from falling off. The desk is only about four inches high, and must have been used by a student sitting cross-legged on the ground, as Orientals still do.

Most of the wooden articles are made of ordinary varieties of timber, but the carpenters showed the preference they have always had for good tools. Numbers of mallets and wedges have been found that are made of mahogany.

It is in household gear, however, that the ruins are richest. The people of Karanis were not rich and they lived simply, but they had their own standards of comfort and were apparently able to maintain them when times were good. Metal pots and pans for the housewife's kitchen-work were of course unknown, but earthenware pots she had in abundance and in all conceivable sizes and shapes. Great pottery jars for the household supply of water stood by the door, on stone stands. Pottery lamps hung from the ceiling beams or stood on brackets.

Anybody who thinks that glassware for table use is a modern invention will have his eyes opened if he walks through the rooms of the museum at Ann Arbor. These Karanian women liked nice things, too, even if they weren't princesses, and they could set well-shaped glass bowls, goblets and bottles on the table when there was company for dinner. Most of it is delicately-tinted glass, too; the blues and greens are especially attractive.

And when the party was on, it seems not unlikely that the ancient Karanians "made whoopee" in a style not unlike that of Main Street—or Broadway. Witness a pair of wooden castanets: evidently the Egyptians of that day did not need to wait for Spanish teachers, although in that climate fringed shawls were a superfluity. Witness also a set of dice, spotted in exactly the same pattern that marks the dice of today. "The boys in the back room" had their own

ideas of relaxation in those days as they have now.

But the folk of Karanis, whatever their daily labor or household cares or even frivolities, had one touch of nature that makes them even more kin to us of the present time. All through the village are the reminders of children. The toys scattered about, perhaps as the children left them before their parents decided to pack up and go to a more prosperous town, are mute witnesses of the affection which the Egyptians have always felt for their offspring.

They are, moreover, witnesses of the unchanging minds of children through the ages, for the outstanding pieces of the toy section in the University of Michigan museum are things on which children of today would pounce as eagerly as did their prototypes of twenty centuries ago. There is a handful of marbles, stained and discolored now, but round enough and of the right size, so that your own boy could take them outdoors this minute and "knuckle down" with them. There are wooden toys on wheels, especially little wooden horses, so like those favored by toddlers of four or five that these old Egyptian toys could be repainted and sold at any toy shop without being noticed as unusual at all.

But perhaps the prize of the whole toy exhibit is a rag doll. It is probably the oldest rag doll in the world, though certainly not the first rag doll that was ever made. It is not a big rag doll, and certainly not a beautiful one. It is just a wisp of linen cloth tied over a chance bit of stuffing with string—the kind of thing that a busy mother makes in a couple of minutes to quiet a clamoring youngster. Or perhaps some little Egyptian girl made it herself, and crooned happily over it afterward. The workmanship is crude enough to be that of a child's fingers. But it was enough to satisfy the budding maternal instinct of a young daughter of Egypt, in the far-off days when, somewhere under the same sky, a slim foreign girl from the North, but little older than herself, sat under a palm-tree tending her infant Son.

*Science News-Letter, April 26, 1930*

Scientists who have been studying insect flight say that the rapidly whirling wings of some insects are very similar to the rotating propellers of airplanes.



## FIRST GLANCES AT NEW BOOKS

**THE DEVIL, An Historical, Critical and Medical Study**—Maurice Garcon and Jean Vinchon, translated by Stephen Haden Guest from the sixth French edition—*Dutton*, 288 pp., \$3.50. The Christian Devil, his origins and relation to other evil powers, and the remarkable activities credited to him in the Middle Ages, make up the first part of this book. Part two shows how these delusions were induced and intensified by the witch-hunters, and gives case reports of patients of the authors who reproduced many of the classical symptoms of "possession." How fortunate the patients born in an age which gives them psychiatric treatment instead of burning them at the stake, as the intelligent world would surely have done only three hundred years ago!

*Psychiatry—Religion*  
*Science News-Letter*, April 26, 1930

**AGRICULTURAL SURVEY OF EUROPE: HUNGARY**—L. G. Michael—*U. S. Government Printing Office*, 104 pp., 20c. An agronomic and economic birds-eye view of the Corn Belt of Europe.

*Agriculture*  
*Science News-Letter*, April 26, 1930

**THE CONDUCTION OF ELECTRICITY THROUGH GASES**—K. G. Emeléus—*Dutton*, 94 pp., \$1.10. So important is the subject of electrical conduction through gases because of its modern applications in vacuum tubes, x-ray tubes, photo-electric cells, etc., that this comprehensive account of its latest theories assumes special interest. Though not a popular work, it is not beyond one ordinarily well trained in physics.

*Physics*  
*Science News-Letter*, April 26, 1930

**PHYSIOLOGY AND HEALTH**—C. E. Turner—*Heath*, 282 pp., \$1. A text for high school students. The material is clearly and interestingly presented and the book is well illustrated. The author is professor of biology and public health at the Massachusetts Institute of Technology.

*Physiology—Hygiene*  
*Science News-Letter*, April 26, 1930

**VEGETABLE GROWING**—James E. Knott—*Lea & Febiger*, 352 pp., \$3.25. A textbook for use in beginning courses in vegetable growing in agricultural colleges. For many students, who will have opportunity to take only one course in this subject, their text will afterwards become a most useful working reference book.

*Horticulture*  
*Science News-Letter*, April 26, 1930

**EXPLORATIONS AND FIELD-WORK OF THE SMITHSONIAN INSTITUTION IN 1929**—*Smithsonian Institution*, 222 pp., Adventures and discoveries in 21 foreign countries and ten of our states, described by the explorers themselves. The subjects range from sun-rays to mollusks, from boron minerals of Death Valley to prehistoric Eskimos of Alaska, from "A Visit to European Zoos" to "Explorations in Haitian Caves." Following through these brief narratives of achievement, the reader does not need to be told that much of the advancement of science comes from the field work of carefully planned expeditions.

*General Science*  
*Science News-Letter*, April 26, 1930

**THE WAYSIDE INN FOR BIRDS**—J. L. Martin—*Heath*, 196 pp., 88c. What one man, sentenced to bed on a sanitarium porch, was able to learn about birds by establishing a cafeteria for them. He demonstrates most astonishingly well the fact that one need not travel in order to see the world; post yourself at a convenient place, keep your eyes open, and a deal of interesting world will come to you to be seen.

*Ornithology*  
*Science News-Letter*, April 26, 1930

**PROPERTIES AND USES OF DRUGS**—Henry H. Rusby, A. Richard Bliss, and Charles W. Ballard—*Blakiston*, 823 p., \$6.50. A text book for the student of pharmacy which will be useful to the practising pharmacist as well. The book appears to be full and well arranged. The appendices deal with some of the things besides drugs often called for at drug stores, particularly in country and suburban stores. These are insecticides, parasitocides, fungicides, sick room supplies and utensils, and a table of doses of the drugs commonly used in veterinary practice for domestic animals.

*Pharmacology*  
*Science News-Letter*, April 26, 1930

**WHY BE AN EVOLUTIONIST?**—H. F. Cleland—*Coward-McCann*, 73 p., \$1.50. The apologia of a modern scientist who is also a religious man. His efforts at the synthesis of an acceptable universe out of the not yet completely reconciled masses of evidence will doubtless help many other minds who find themselves at the same perplexing crossroads.

*Evolution*  
*Science News-Letter*, April 26, 1930

**LOVE IN THE MACHINE AGE**—Floyd Dell—*Farrar and Rinehart*, 428 p., \$3.50. A leading novelist infuses with warm human sympathy the fundamentals of human relations in this new civilization. With his viewpoint, too often lacking in research reports, he has made a thorough and scholarly survey of the sciences which deal with human behavior. His documented sources include the modern classics of the National Committee for Mental Hygiene, the Russel Sage Foundation, and those pioneers who have dared, despite presidents of Missouri, to investigate sex. Following the signposts in many fields, he finds them all pointing to a goal of attainable happiness in work and love of one's own choosing. The new order is opposed to careers and marriages forced upon the young by the now obsolescent patriarchal system. And conversely, he finds that most of our social failures, anxieties and futilities result from the drag of the patriarch's dead hand on our modern world.

*Philosophy*  
*Science News-Letter*, April 26, 1930

**UR OF THE CHALDEES**—C. Leonard Woolley—*Scribners*, 208 p., \$2.50. Mr. Woolley has already given us a pocket history of the people of Ur in "The Sumerians." Here is a pocket record of the excavations at Ur during the past seven years, intended for popular consumption. Work at this exceptionally interesting city has been carried forward to such a point that Mr. Woolley can write with graphic detail of "The Beginnings of Ur, and the Flood," "The Graves of the Kings of Ur," and so on down to "Nebuchadnezzar and the Last Days of Ur."

*Archaeology*  
*Science News-Letter*, April 26, 1930

**MOSS FLORA OF SOUTHEASTERN WASHINGTON: PARTS 1 AND 2**—G. N. Jones—*State Coll. of Washington* (50c each). These two pamphlets together make a brochure that will be very useful to bryologists.

*Botany*  
*Science News-Letter*, April 26, 1930

**ANNUAL REPORT—The Commonwealth Fund**, 99 p. An account of the activities in education, public health, mental hygiene, etc., undertaken by the Fund for the year ending in September, 1929. Of special interest to educators and public health and social workers.

*Sociology*  
*Science News-Letter*, April 26, 1930

## First Glances at New Books—Continued

**MODERN SCIENCE: A GENERAL INTRODUCTION**—J. Arthur Thomson—*Putnam*, 365 p., \$3.50. The master of popular presentation of natural science in Britain here gives us a book that will be of immense value both to students in general survey courses in colleges and to the adult reader whose education did not stop with his graduation a few years back. It begins, like *Genesis*, with chaos, and shows in clear and diagrammatic fashion how order has arisen and wherein order consists. The latter point, often left unexamined by writers of popular cosmogonies and phylogenies, is the real salt of the book.

*General Science*  
*Science News-Letter*, April 26, 1930

**GEOLOGY AND WATER RESOURCES OF THE MOKELUMNE AREA, CALIFORNIA**—H. T. Stearns, T. W. Robinson and G. H. Taylor—*U. S. Government Printing Office*, 402 p., \$1.25. Of interest to economic geologists, irrigation engineers, etc.

*Geology*  
*Science News-Letter*, April 26, 1930

**CONTRIBUTION TO THE TAXONOMY OF ASIATIC WASPS OF THE GENUS TIPHIA (SCOLIIDAE)**—H. W. Allen and H. A. Jaynes—*U. S. National Museum*. Of interest to systematic entomologists.

*Entomology*  
*Science News-Letter*, April 26, 1930

**DEATH VALLEY**—Bourke Lee—*Macmillan*, 210 p., \$4. All that a lot of us know about Death Valley is that it is an exceedingly dry and hot place, where a number of men "went west" in the old days because they undercalculated their water needs. Some of us have also seen pictures of a twenty-mule team hauling borax or something. But Death Valley is coming to life. Tourists are going in there in ever-increasing numbers, and one of these days we're going to see a movement to make the place a national park. This book will give the reader some hint of the fascination exercised by the Valley over those who have known it in the old days that do not return.

*Geography—Natural History*  
*Science News-Letter*, April 26, 1930

**LANDSCAPING THE HOME GROUNDS**—L. W. Ramsey—*Macmillan*, 166 p., \$2. Whether you have a big house, a little house or a middle-sized house, this book will contain some hints and pictures that will help you to make your house a pleasanter place to live in.

*Landscape Architecture*  
*Science News-Letter*, April 26, 1930

**DEAD TOWNS AND LIVING MEN**—C. Leonard Woolley—*Oxford Univ. Press*, 259 p., \$2. When Mr. Woolley visited America following his discoveries at Ur of the Chaldees, he found himself answering questions about how he works at digging up buried civilizations, whether it is exciting, how an archaeologist knows where to dig for his particular kind of treasure, and so on, endlessly. Mr. Woolley had some time ago written just this sort of informal account of himself in order to amuse his fellow war prisoners in a Turkish prison camp. So he has decided "to risk the success of an American edition," and here it is. The adventures are from his digging in Italy, Egypt, and the Hittite country.

*Archaeology*  
*Science News-Letter*, April 26, 1930

**REPORT, 1927-28, ROTHAMSTED EXPERIMENTAL STATION**—D. J. Jeffery, *Harpenden, England* (2s. 6d.). A summary of the activities for a year at the world's pioneer agricultural experiment station.

*Agriculture*  
*Science News-Letter*, April 26, 1930

**THE AUTONOMIC NERVOUS SYSTEM**—Albert Kuntz—*Lea and Febiger*, 569 p., \$7. An unusually fine book on an important subject. The treatment is concise but comprehensive. There is a valuable bibliography of 60 pages. The book is not intended for the lay reader.

*Neurology*  
*Science News-Letter*, April 26, 1930

**SAFETY EDUCATION IN THE SECONDARY SCHOOLS**—Herbert James Stack—*National Bureau of Casualty and Surety Underwriters*, 157 p., \$1.75. A review of the problem and methods, for teachers and administrators.

*Education—Safety*  
*Science News-Letter*, April 26, 1930

**CIRCLING AFRICA**—Isabel Anderson—*Marshall Jones Co.*, 271 p., \$4. Mrs. Larz Anderson has written a chatty account of her travels in Africa as member of a special cruise party. The book is profusely illustrated.

*Travel*  
*Science News-Letter*, April 26, 1930

**ORDOVICIAN TRILOBITES OF THE FAMILY TELEPHIDAE AND CONCERNED STRATIGRAPHIC CORRELATIONS**—E. O. Ulrich—*U. S. National Museum*. Of interest to geologists and paleontologists.

*Geology—Paleontology*  
*Science News-Letter*, April 26, 1930

**PAWNEE MUSIC**—Frances Densmore—*U. S. Government Printing Office*, 129 p., 90c. This Bulletin number 93 of the Bureau of American Ethnology is the seventh of a group of publications on the music of different tribes, by Miss Densmore. The previous studies, she explains, have included no tribe in which ceremonialism is so highly developed as among the Pawnee. Following the plan of the series, the music and words of the songs are given, with a musical analysis, and in addition an explanation of the circumstances in which each song was used, or any other interesting facts about it.

*Ethnology*  
*Science News-Letter*, April 26, 1930

**NORTHERN ROCKY MOUNTAIN TREES AND SHRUBS**—J. E. Kirkwood—*Stanford Univ. Press*, 340 p., \$7.50. With all the writing on the systematic botany of the Rocky Mountain region—most of it competent and authoritative—there is still room for a well-done job of this kind. Without going into detailed examinations of special points, it can be said with confidence that this book will be found highly useful both in the field and in the herbarium and laboratory.

*Botany*  
*Science News-Letter*, April 26, 1930

**INSOMNIA**—Joseph Collins—*Appleton*, 131 p., \$1.50. This small book of practical advice to the layman will be eagerly welcomed by those who suffer from that distressing condition, inability to sleep.

*Medicine*  
*Science News-Letter*, April 26, 1930

**ASIA: AN ECONOMIC AND REGIONAL GEOGRAPHY**—L. D. Stamp—*Dutton*, 616 p., \$8. An excellent presentation of the physical and economic aspects of the great continent that is due to play an increasingly important part in the world's history during the coming generation.

*Geography*  
*Science News-Letter*, April 26, 1930

**EDUCATIONAL BIOLOGY**—John C. Johnson—*Macmillan*, 360 pp., \$3. A textbook in biology especially adapted for teachers' colleges and university schools and colleges of education.

*Biology*  
*Science News-Letter*, April 26, 1930

**ALONG THE SHORE**—Eva L. Butler—*John Day*, 102 p., \$1.25. A simple little book illustrated with simple little outline drawings, that should be useful to elementary teachers and their pupils in regions accessible to the seashore.

*Nature Study*  
*Science News-Letter*, April 26, 1930